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# Experion PKS ®

## Server Specifications and Technical Data

**EP03-200-200**
**Release 200**
Revision Date: December 15, 2003
Version 1.0

## Table of Contents

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# Revision History

| Revision | Date | Description |
|---|---|---|
| 0.1 | 15 August 2003 | Release 200 Preliminary Revision |
| 1.0 | 15 December 2003 | Minor updates for final release |

Revision changes since EP03-200-100:

| Section | Change | Description |
|---|---|---|
| Introduction | M | Updated architecture for R200 |
| Networking | M | Updated section with respect to FTE and ControlNet |
| Extended Event Archiving | A | Moved this section from the Options portion of the document |
| System Management | A | New section for the System Management functionality |
| Honeywell Systems Integration | M | Included paragraph about new TPS Integration functionality (ESVT and ES-T). |
| OPC Connectivity Options | M | Updated section with new functionality (OPC Advanced Client) and discussion of RDM. |
| Redundancy Performance | M | Added note to describe checkpoint process |
| Glossary | M | Added new terminology |

**Legend for Change column:**
*A -- Added*
*D -- Deleted*
*M -- Modified*

# Introduction

**Experion PKS**
The Next Generation Process Knowledge System

Experion PKS® embeds three decades of Honeywell process control, asset management, and domain expertise, combined with Six Sigma methodologies, into a unified Process Knowledge System architecture. Experion PKS optimizes work processes, improves routine maintenance efficiencies, and releases personnel from manual processes. Capturing and managing untapped process knowledge in a single Process Knowledge Solution™, Experion PKS delivers process and control data using innovative technologies that are only offered by Honeywell. These technologies fully integrate with existing Honeywell systems, including TPS, TDC2000®, TDC3000®, **TotalPlant®** Alcont, FSC, and the PlantScape® system.

## *Process Knowledge – Beyond Distributed Control*

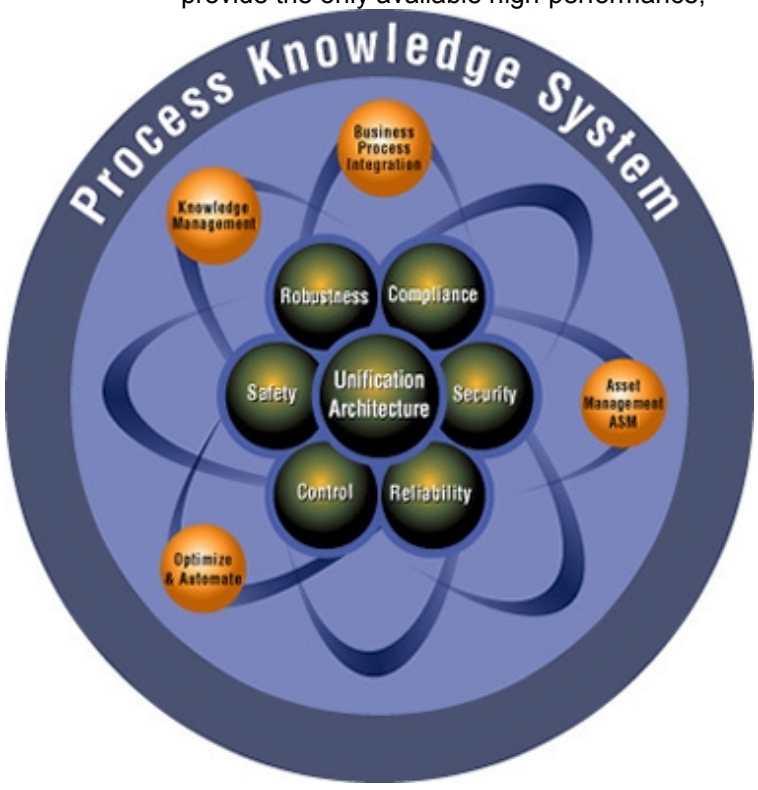
Experion PKS Process Knowledge capabilities expand the role of distributed control, addressing all of manufacturing's critical business objectives to facilitate knowledge sharing and workflow management. The result is improved operating profit, capital cost and cash flow. Delivering a robust, scalable, plant-wide system, Experion PKS connects your operations staff with the latest automation technology as well as with each other. Built on a rock-solid foundation of process control and safety system know-how, this next-generation system provides unprecedented connectivity through all levels of process and business operations. This is a truly collaborative production and safety management solution.

In addition to embedding Distributed Control System (DCS) technologies, Experion PKS integrates powerful knowledge-driven decision support and diagnostic tools, providing information where and when it is needed. This revolutionary system approach unifies business, process, asset, and safety management to:

- Facilitate knowledge capture
- Promote knowledge sharing
- Optimize work processes
- Accelerate improvement and innovation

## *Unified, Collaborative Architecture*

Experion PKS is a unified, collaborative architecture with state-of-the-art DCS capabilities that encompass Abnormal Situation Management® (ASM®), Safety Management, and Information Management technologies. Experion PKS interfaces with FOUNDATION* Fieldbus, Profibus, DeviceNet, LON, ControlNet and Interbus. Robustness, security, compliance, control, safety, and reliability are plant-wide, penetrating all layers of the architecture to provide the only available high-performance,



plant-wide infrastructure. Experion PKS' distributed control features include a complete continuous, logic, sequential, and drive object-oriented control environment hosted on fully redundant controllers.

By unifying the plant-wide architecture, Experion PKS allows you to make the right product at the right time, optimize and automate, increase workforce effectiveness, and increase availability of resources while reducing incidents. Rather than taking the narrow instrument-centric approach that informs you only when there is a need to replace a valve or perform maintenance, Experion PKS establishes a broad, process-centric view of your plant operations by focusing on the impact to operational objectives, not only the replacement of devices. This is the key to optimizing performance. Combining DCS functionality and a plant-wide infrastructure, the Experion PKS unified architecture provides collaborative production management solutions for Knowledge Management, Asset and Abnormal Situation Management, Business Process Integration, and Optimization and Automation.

## Architecture Overview

Experion PKS comprises many different integrated hardware and software solutions depending upon the needs of the installation. Figure 1 is a representation of many of the possible nodes that can be utilized in an Experion PKS architecture. Note that the architecture is highly scalable and not all nodes are necessary or required.

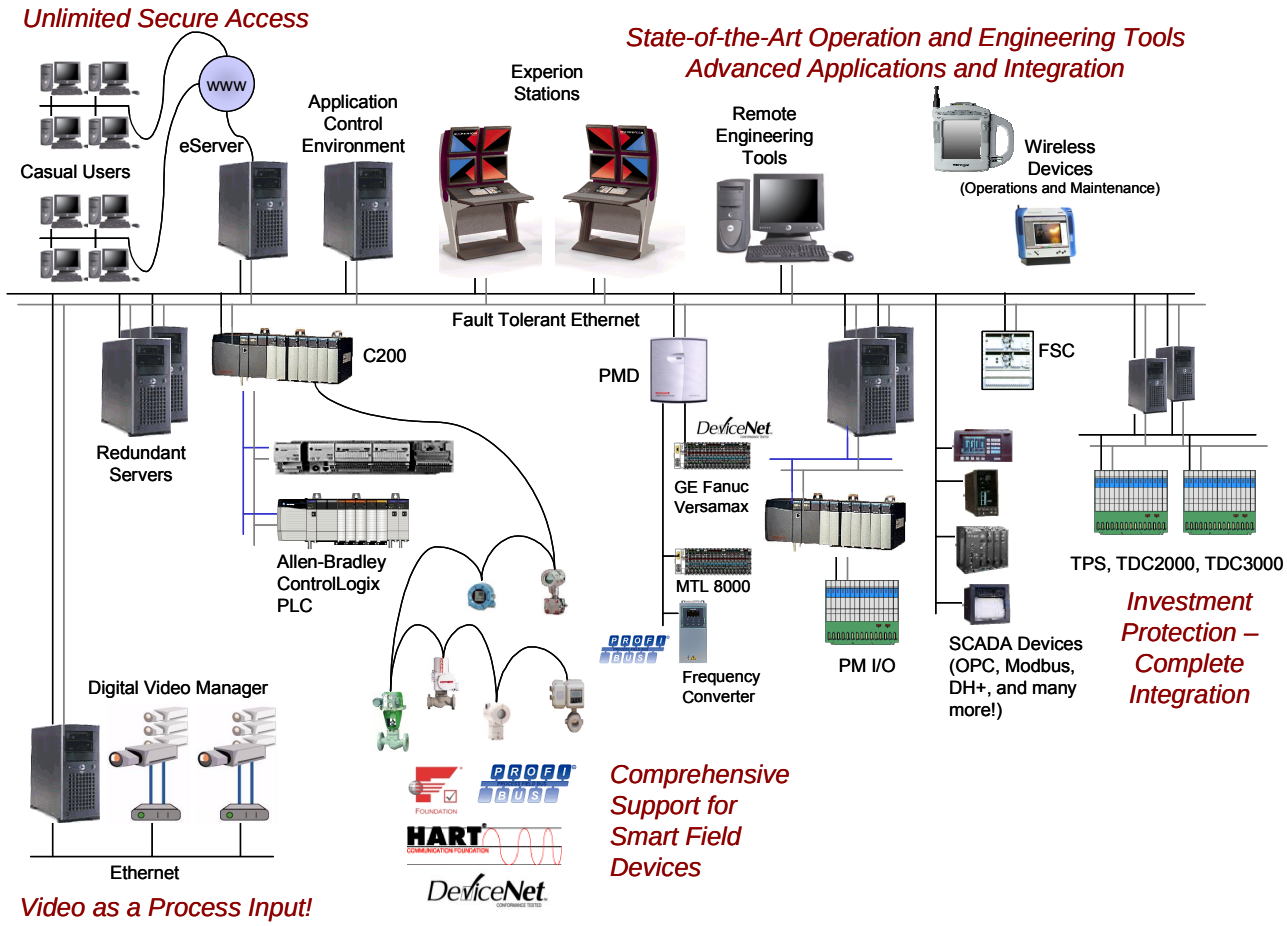



**Figure 1. Sample Experion PKS Architecture**

## Experion PKS Server Overview

This document describes the specifications and technical data for the Experion PKS Server hardware and software.

One or more Servers are required for an Experion PKS system. The Functional Description section of this document provides technical details about the standard functionality of the Experion PKS Server.

Integral Server functionality is also available as options to be "turned on" when required. These are identified in the Options section of this document and include technical details on functions such as:

- Server Redundancy – an on-line synchronized backup provides high availability to your process.
- Fault Tolerant Ethernet (FTE) – FTE utilizes off-the-shelf networking hardware to allow Ethernet to provide "DCS network" functionality.
- Distributed Systems Architecture (DSA) – DSA brings multiple "systems" together in a seamless manner.
- Honeywell System Integration – Honeywell Systems such as TDC 2000, TDC 3000, TPS, and FSC are comprehensively integrated into Experion PKS.
- OPC Connectivity Options – the Experion PKS server can serve data and alarms and events to OPC clients or it can act as a client to other OPC servers.
- SCADA Interfaces –multiple interfaces to RTUs, PLCs, and other devices are available to integrate these devices into your control system.
- 21 CFR Part 11 Functions – Experion PKS provides the necessary functions, such as Electronic Signature support, for regulated industries.
- Alarm Pager – send alarms directly to your maintenance crew's pagers, e-mail, and more.
- On-process Migration – migrate the Server software from a current release to the next available release without taking the Experion PKS System off line.
- Open Data Access – Whenever you need to get Experion PKS data into a spreadsheet or database, for example, Open Data Access is required.

The Server is a required component of Experion PKS. All the functionality described in this document, including the options, are core functionality. That is, it is developed as a system and licensed as options to allow users to simply purchase what is necessary. Options are not unwieldy add-ons that only manage to complicate the system.

Options can be purchased at any time and added to your system with a simple license key. Most options do not even require an additional software installation.

# Functional Description

## *Real Time Database*

At the heart of the Experion PKS Server software is the Real Time Database. The following information is stored in the Real Time Database:

- Acquired Data – data read from or related to controllers
- Process History – historical store of acquired data
- Alarms and Events
- System Status
- Configuration Data – details on how the Experion PKS Server subsystems have been configured to operate
- User Defined Data – structures to store application specific information

To maintain data integrity, memory resident portions of the Real Time Database are periodically written to the hard disk in a process known as checkpointing.

The Experion PKS Server software consists of a number of functional subsystems as shown in Figure 2.

### Executive Subsystem

Time keeping and scheduling is the major function of the Executive subsystem. In essence, this subsystem manages all scheduled tasks throughout the server. This includes items such as requesting display updates, requesting scheduled reports, watch dog timers for custom applications.

### User Interface Subsystem

For server-connected Stations, this subsystem manages two tasks:

- Keyboard requests, and
- Writing data to the Station and reading data entered at the Station

### Acquisition and Control Subsystem

For Control Execution Environment (CEE) devices, such as the C200 controller and ACE (Application Control Environment) node, this subsystem manages a dynamic cache of data for display on graphics, for history, and for use by external applications. This cache grows and contracts dynamically depending on the needs of its users – Station displays, applications, etc. This is an extremely powerful mechanism as it means that not all data is polled from the C200 controller (and other CEE devices). Rather, data is only subscribed and updated by exception based on a need from a user. And, if more than one user or application requires the same set of data, the cache provides this data without making duplicate requests to the controller. When users stop requesting data, the cache no longer asks for the data.

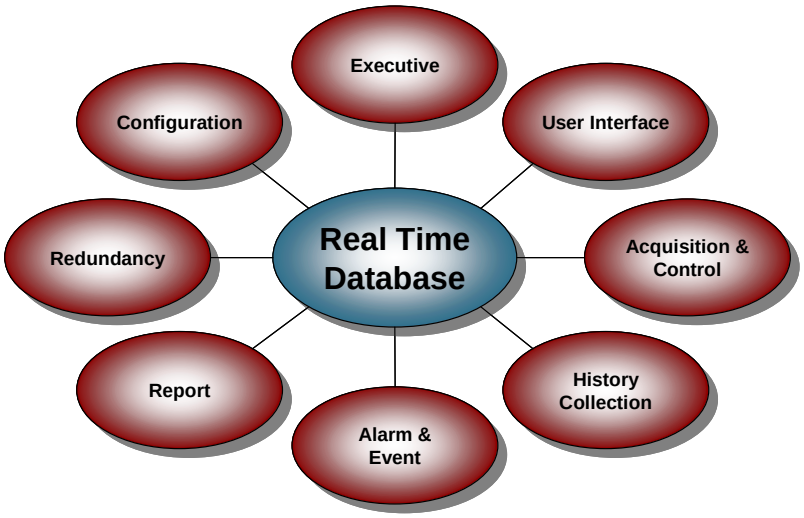



**Figure 2. Server Subsystems**

Data acquisition and control for SCADA devices is also handled by this subsystem. When points are downloaded to the server using Quick Builder (see page 12), scan tables are built that define how data will be acquired. The server polls the devices (RTUs, PLCs, etc.) at periodic rates. Depending on the interface, report by exception and other scanning mechanisms are supported.

## History Collection Subsystem

The on-board history collection system of the Experion PKS server is composed of three history classes.

- Standard History
  - ✓ 1 minute snapshot
  - ✓ 6 minute average
  - ✓ 1 hour average
  - ✓ 8 hour average
  - ✓ 24 hour average
- Fast History
  - ✓ User selected – 1, 2, 3, 4, 5 (default), 10, 15, or 30 second snapshot
- Extended History
  - ✓ 1 hour snapshot
  - ✓ 8 hour snapshot
  - ✓ 24 hour snapshot

Historical data can be archived. The archiving capabilities include the ability to retain archives on the server hard drive, move the archive to another drive after a defined period of time, or to delete the archive after a defined period of time. Archiving will not occur if the hard drive falls below a configurable amount of free space.

Once collected, historical data is available for use by rend displays

- Custom displays
- Reports
- Application programs
- Spreadsheets
- ODBC compliant database

The archiving capabilities provide effectively unlimited duration of historical storage.

If additional history features are necessary, Honeywell's Uniformance® PHD is optimally suited for the task.

## Alarm and Event Subsystem

Alarming for points from CEE devices, known as Process points, are alarmed and time stamped at the controller. SCADA point alarms are initiated, time stamped, and acknowledged by the server.

Each of the configured alarms can be assigned a priority ranging from Journal, Low, High to Urgent. An alarm sub-priority (0 to 15) can also be assigned to further differentiate alarms.

All alarms are recorded as events. Additionally, login actions, operator actions, and configuration changes are logged in the event journal.

## Report Subsystem

The report subsystem is designed to create reports from a list of standard and optional reports. This subsystem maintains the report configuration for scheduled or on-demand execution.

## Redundancy Subsystem

The redundancy subsystem is designed to fail over to a backup server in the event of a single failure of the primary or controlling server. Please see the section titled Server Redundancy on page 13 for more details on this optional function.

## Configuration Subsystem

The real time database manages the configuration information downloaded by Control Builder and Quick Builder. For further information on these tools, please see EP03-300-200, Experion PKS Controller Specification & Technical Data for Control Builder and page 12 of this document for Quick Builder.

# *Point Structures*

For Process points (those points resident in CEE devices such as the C200 controller), a standard database point structure is built in the Real Time Database upon download to the device. This point structure includes a minimum of necessary parameters. Additional parameters are dynamically added to the point database as needed when requested for display, history collection, etc. This supports the dynamic cache (see the Acquisition and Control Subsystem section of this document) by providing an explicit link to the data. In this way, the cache does not have to learn where to get the data each time it is subsequently requested.

The Real Time Database also provides the following standard SCADA point structures:

- Analog Point Structure
- Status Point Structure
- Accumulator Point Structure
- User Defined Structure
- Algorithms
- Container Points
- OPC Advanced Points

For further detail on the parameters associated with Analog, Status, and Accumulator point structures, please see page 27 in the Specifications and Sizing section of this document.

Each point in the database has a number of associated parameters, all of which can be referenced relative to a single tag name or 'composite point'.

## User-defined Parameters

With each of the above point types, it is possible to add user-defined parameters to the existing pre-built parameters. This enables tags to be extended to contain free format values, constant values, or values used by applications and scripts to store calculated or derived plant information. User defined parameters can be assigned to history collection.

## User-defined Structure

In order to support other types of data such as user entered or calculated data from application programs, the server provides a user-definable database area that is fully integrated into the system. Data contained in this database is accessible by:

- Custom Graphics
- Custom Reports
- Server based Application Programs
- Network based Applications Programs
- Composite points

## Algorithms

In addition to standard point processing functions and VB scripting, the system allows additional processing through the use of standard algorithms that may be attached to an analog, status or accumulator point.

Functions provided by these algorithms include:

- Arithmetic calculations
- Boolean calculation
- Maximum/minimum value
- Integration
- Run hours totalization
- Group alarm inhibit
- Report request
- Application program request

## Container Points

Container Points support the Template Display capabilities. A container point combines a group of logically associated points into a single point structure. The container point parameters are flexible. For example, a container point could be built for a tank that includes the:

- Level
- Temperature
- Fill valve status
- Drain valve status
- Agitator status

## Point Scripting

With each standard SCADA and Process point, an easy-to-use VBScript can be attached to enable powerful point based scripts to be processed. These scripts can be enabled: OnAlarm, OnChange, OnNormal, OnAcknowledge and more. The powerful scripting environment also enables Library scripts to be created, enabling repetitive logic to be simply applied on many points. For further details, please refer to the section titled Server Scripting on page 10.

## User-defined Data Formats

Data formats convert field values into values that are more useful for operators and other applications. In addition to a wide range of standard data formats appropriate for the optional SCADA interfaces, you can create user-defined data formats for the OPC Client, Allen-Bradley, and Modicon Interfaces.

When a SCADA point is configured to use an unscaled user-defined data format, the value is formatted, but not scaled, prior to loading it into the parameter. Therefore, the scaling for each parameter that uses the

format must be defined. Scaled user-defined data formats will format and scale a field value before loading it into the parameter.

# Networking

## Fautl Tolerant Ethernet

A Fault Tolerant Ethernet (FTE) license is bundled with the Server software. FTE provides a robust and high availability network infrastructure for communicating to Experion Stations, C200 controllers, ACE Nodes, etc. Refer to page 13 for more information about FTE.

## Ethernet

Experion PKS Servers also support a network infrastructure of single or redundant Ethernet to communicate to nodes throughout the system.

## ControlNet

As an option, ControlNet can be used to communicate with C200 controllers. For more information, please refer to document EP03-300-200, Experion PKS Controller Specification & Technical Data.

# Server Scripting

Server Scripting encompasses two features. The first provides scripting support to allow the behavior of the Server-resident subsystems and its run time objects to be extended. Examples of server objects are:

- Server
- Points and Parameters (described in the section titled Point Scripting)
- Reports
- Areas
- Tasks (Application Programs)

The user configures these scripts to be run by the server either periodically or when a specified event occurs. In addition, standard displays are supplied to allow the user to monitor the status of running scripts.

Example scenarios of when to use server scripts include:

- Raising an Urgent Alarm when Related Points Go into Alarm
- Changing the Ranges of Related Points
- Checking a Point's Value after It has Gone into Alarm
- Using Auxiliary Parameters to Store and Display Data
- Reading Data from a Text File
- Checking a Value at Regular Intervals
- Generating and Emailing Reports (see Figure 3)
- Capturing and Storing Data in a Text File
- Emailing in Response to Unacknowledged Alarms
- Launching an External Application
- Performing the Same Calculation on a Set of Points

The second feature is the Server OLE Automation Object Model that allows Automation Controllers to access and manipulate objects that exist within the Server's run time environment. Automation Controllers include products such as Microsoft Visual Basic, Word, Excel, Access and any programming environment that can use Microsoft COM objects.

Server scripting uses the Server OLE Automation Object Model as the means by which it interacts with the server objects. These two features together form the Server Scripting support. The architecture employed by Server Scripting gives it great flexibility and functionality. There are some

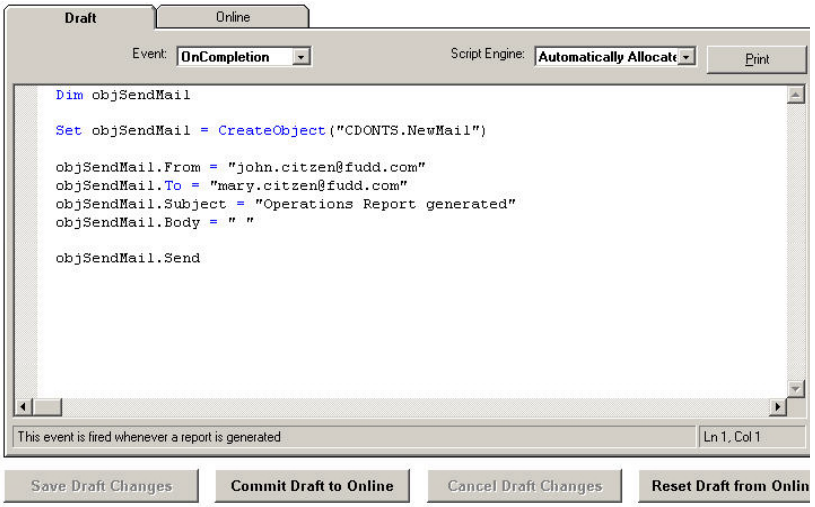



**Figure 3. Server Scripting Editor**

tasks however, that are better suited to a custom application.

Consult Table 1 to help classify tasks into those that are well suited to Server scripting and those that are better addressed by a custom application. Some tasks qualify for both categories, and the rules are flexible when deciding what tasks can and cannot be performed by Server scripts. Where possible, existing server functionality should be used in preference to writing Server scripts. Standard server functionality optimizes the task implementation.

**Table 1. Server Scripting versus Custom Application**

| Task | Server Script | Custom Application |
|---|---|---|
| Extend server functionality via information transfer | Yes | Yes |
| Relatively short processing (< 50 lines of code) | Yes | Yes |
| Used to provide linkage to other applications via automation servers | Yes | Yes |
| Code is interpreted at run-time. | Yes | No |
| Code is compiled and optimized at build time. | No | Yes |
| Computationally intensive | No | Yes |
| Optimized for supervisory control | No | Yes |
| Iterative code | No | Yes |
| Relatively complex user interface requirements | No | Yes |
| Extensive file handling | No | Yes |
| Script (program) state preserved on failover | No | No |
| Language | VBScript | Visual Basic, C++, etc. |

## Extended Event Archiving

Extended Event Archiving may be used when the events logged by the system must be archived for later review. Storage capacity is dependent upon media capacity, but storage of over 1 million events is easily achievable. Approximately 60 Mb of hard disk space is required for every 100,000 events archived.

Archived events can be restored so that they are available for reporting. Event archives are restored to a playback database. They are then available for reporting and can be viewed on the Event Summary display.

## System Management

Because Experion PKS comprises a plant-wide infrastructure with many PC-based nodes, a system management infrastructure is provided to handle the architecture as a system. Two key components are the System Performance Server (SPS) and the System Event Server (SES).

### System Performance Server

The SPS collects system information from each Windows 2000 or Windows XP node and exposes the data as OPC data items. This data is then available to be historized, displayed on a process graphic, etc. Additionally, any OPC Data Access Client would have access to the data.

### System Event Server

Similarly to the SPS, the SES collects and consolidates Windows 2000 and Windows XP Event Log information and exposes them as OPC alarms and events. These alarms and events are then available to be displayed in the standard Experion PKS alarm and event summary displays used in reports, etc.

# Engineering Tools

Control Builder is used to configure Process Points whereas Quick Builder is used to configure SCADA points.

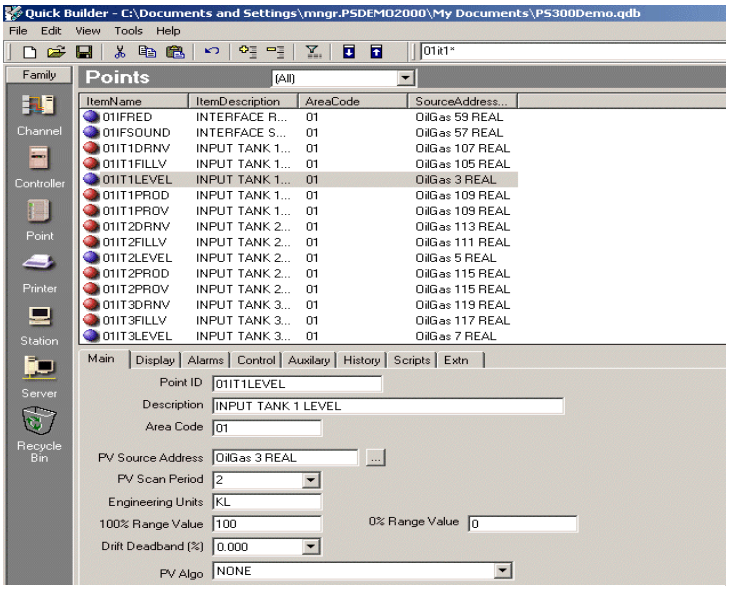



**Figure 4. Sample Quick Builder Configuration**

Control Builder is a graphical, object-oriented, windows-based engineering tool for designing, configuring and implementing control strategies in the Control Execution Environments (CEE) of the C200 and ACE (Application Control Environment). It is used to configure hardware – such as networks, I/O modules, controllers, and fieldbus devices – as well as control points – like regulatory control, device (motor) control, discrete logic, sequential logic and special user-defined functions. Further details about Control Builder can be found in document EP03-300-200, Experion PKS Controller Specification & Technical Data.

Quick Builder allows users to configure points, communication links to controllers/RTUs, stations and printers. Quick Builder leverages a relational database engine to provide greater productivity through capabilities such as filtering user views of the database, multipoint edit facilities and the intuitive Windows style interface. Other features that the relational database provide are the user-defined fields that can be used for termination schedules, wire numbers, etc., and a standard set of reports.

Additions and modifications to the Experion PKS database can be made while the system is on-line.

# Options

## Server Redundancy

The Experion PKS Server is optionally redundant. The redundancy subsystem provides a high availability platform by enabling a pair of similarly configured servers to support each other in a primary/backup fashion. Should the Primary fail, a fully functioning Backup assumes the Primary role. Primary refers to the specific server that is actively acquiring data from the controllers/RTUs and serving data to the clients. The Primary propagates all database transactions to the Backup over a redundant network so that both databases remain in complete synchronization.

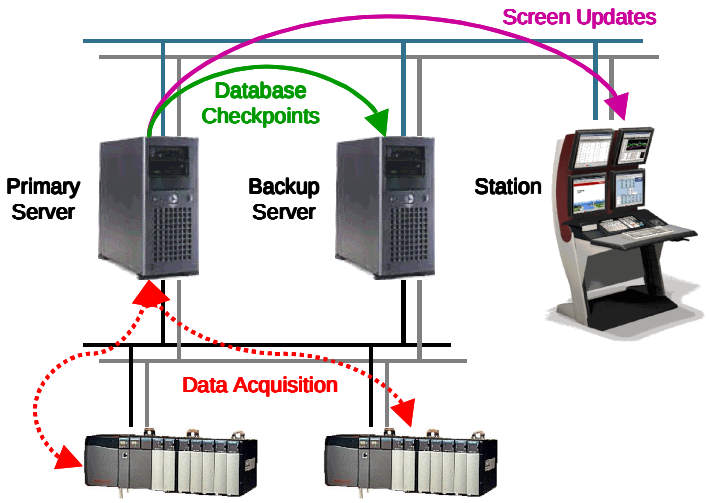



**Figure 5. Server Redundancy**

The backup server takes over from the primary server if one of the following conditions occurs:

- The primary server hardware fails and the backup cannot communicate with it
- All network links between the primary and backup server are broken
- The primary loses C200 communications
- A user does a manual failover

In addition to synchronizing necessary database files, the redundancy subsystem is capable of automatically copying user files from the primary server to the backup. Files such as custom displays, application source files, and history archives are copied every 60 minutes (default) if they have changed since the last synchronization.

## Fault Tolerant Ethernet

As an alternative to conventional Ethernet redundancy schemes that typically employ two separate Ethernet networks, Experion PKS can be deployed using FTE. The FTE solution employs a single logical network over redundant media and does not require a server or station to re-establish a network connection. By providing more communication paths between nodes, FTE also tolerates more faults, including all single faults and many multiple faults. In addition, FTE is transparent to higher-level applications, which benefit from the high network availability FTE provides, without requiring any additional software configuration. Normal Ethernet nodes (non-FTE) can also connect to an FTE network and benefit from a more available communications environment than conventional Ethernet redundancy schemes offer.

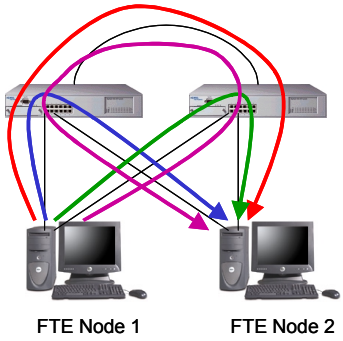



**Figure 6. Sample FTE Configuration Showing Four Data Paths from One FTE Node to Another**

For additional information on FTE, please refer to document EP03-500-200, FTE Specification & Technical Data.

## *Distributed Systems Architecture*

Distributed Systems Architecture (DSA) is the ideal solution for integrating processes when there are multiple control rooms, or for segmenting control across units, providing the ultimate flexibility for both operations and control. Distributed Systems Architecture also provides the maximum flexibility for geographically distributed sites. For example, it allows multi-segment pipelines and oil and gas fields with a large number of wells to be managed from multiple remote locations, as well as a central control room – another industry first from Honeywell.

Figure 8 shows an example of a distributed system connected using a wide area network. The master control center accesses data from the servers at each remote site. It may or may not have its own locally connected controllers. The servers at the remote sites may also exchange information with each other logically creating a global database including:

- Global real time data access
- Trending of real time and historical system wide data, on a single trend
- Global alarming
- Global system messages

## Consolidated Alarm Summary

The Alarm Summary (for details on the Station Alarm Summary, please reference document EP03-210-200, Experion PKS Station Specification & Technical Data) shows a consolidated list of local and remote alarms. The remote alarms displayed to an operator are those from the remote areas for which alarms are enabled on the local server, and which have been assigned to the Station or operator. Local and remote alarms can be filtered in the same way. The Station Alarm Zone shows the highest priority unacknowledged alarm, regardless of whether it is a local or remote alarm.

An operator can navigate directly to the Associated or Point Detail display for a remote alarm, just as for a local alarm.

## Trends

When a trend includes a remote point, historical data for that point is retrieved from the remote server in real time.

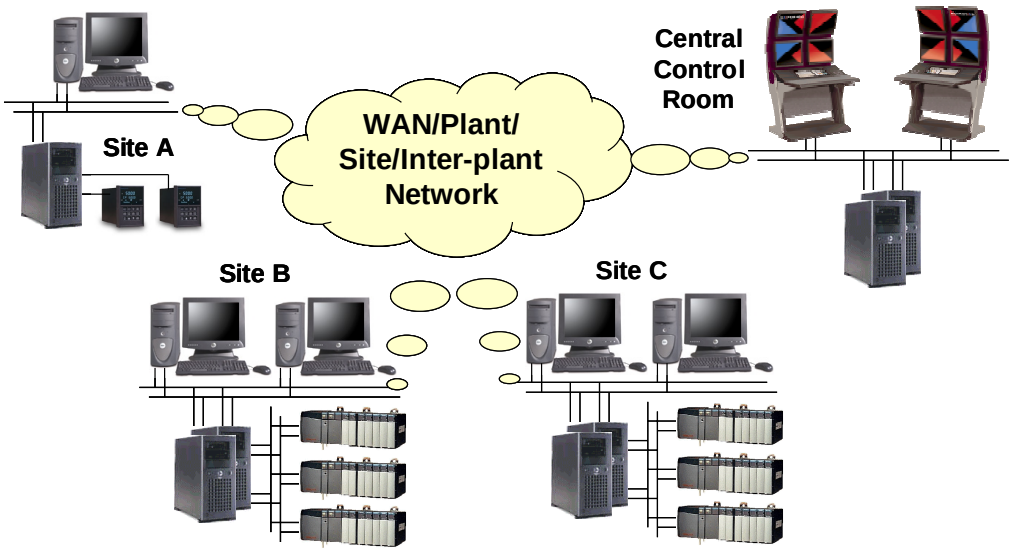



**Figure 7. Distributed Systems Architecture Example**

# *Honeywell Systems Integration*

Release 200 of Experion PKS introduces a full-scale integration of TPS beyond the functionality of prior options available. The functionality introduced with nodes such as Experion Server TPS and Experion Station – TPS are the preferred method for adding Experion PKS to a TPS installation. The details of this exciting solution are available in a separate document; EP03-xxx-200, Experion PKS TPS Integration Specification & Technical Data.

Experion PKS continues to provide a range of options for integrating Honeywell solutions.

## TotalPlant Solution (TPS) System Integration

TPS Integration delivers TPS notifications (alarms and events) to Experion PKS's powerful Alarm, Event, and Message Summary displays. Data and Notifications are available on a TPS Unit basis and are utilized within the system as if the data were native to Experion PKS. This integration provides an efficient caching mechanism that "discovers" TPS point parameters as needed without developing a "mirrored" database.

The TPS Integration option employs patented technologies developed for Honeywell's award winning Distributed Systems Architecture. This technology provides a caching mechanism that only requires the Integration Node to provide recently requested data. In other words, the underlying LCN does not have to provide constant updates for the entire LCN database. Rather, only data that changes for points in the dynamically changing cache are required from the Integration Node. This contrasts with polling techniques that would put a heavy burden on the LCN for data updates.

Integration can be as simple as providing a network connection between the Experion PKS Server and an Integration Node. The integrated connection also supports Honeywell's unique Fault Tolerant Ethernet, and redundant Integration Nodes, delivering the secure, fault tolerant connection you expect.

## Honeywell TDC3000 Data Hiway Integration

Experion PKS provides a tight integration with a wide range of Honeywell TDC3000 Data Hiway devices. No other package can meet the level of integration provided by Experion PKS for existing Data Hiway equipment.

Experion PKS's Integration with TDC3000 begins at the Hiway layer. Using a Data Hiway Bridge, Experion PKS is enabled as a preferred access device on the Hiway. This Bridge provides Experion PKS with efficient Ethernet access to Hiway data and can coexist with other preferred access network devices, like the Basic Operator Station or Extended Operator Stations. The Data Hiway Bridge is a Honeywell product, so it provides reliable, stable integration with the existing Data Hiway equipment. Bridges may be redundant for any Data Hiway. Multiple Data Hiways are supported with additional Data Hiway Bridges.

All box/slot configurations on each box can be performed via system displays in Experion PKS. No custom displays are required. Box status information can also be displayed directly in Experion PKS with the supplied system displays. If Box errors are reported, a full description is immediately displayed on the Controller Summary Display, allowing an operator or engineer to take remedial action.

Experion PKS provides a CL/MC (Control Language for Multifunction Controller) compiler, which has the same capability as the CL/MC compiler used in TPS systems. This allows the user to write, compile and manage control strategies for the Multifunction and Advanced Multifunction Controllers, in Experion PKS. The complier also allows the CL/MC source code from a TPS system to be re-compiled on the Experion PKS Server after TPS specific tags have been replaced with their Experion PKS equivalents. While Experion PKS is not able to compile SOPL programs (the language used by EOS Stations), it can be used to

upload and download the compiled object code to the controllers.

Services are also available with the Experion PKS TDC3000 Integration to electronically convert your existing EOS/BOS Hiway databases and perform SOPL to CL conversions. This unique service takes your existing 8" or 5 ¼" database images and builds a compatible version in Experion PKS.

**Table 2. Supported TDC3000 Data Hiway Devices**

| Controller Type | Acronym | Description/Notes |
|---|---|---|
| Basic Controller | CB | The Basic Controller handles continuous Input/Output operations. It accommodates I/O for eight modulating slots, plus eight analog inputs. |
| Extended Controller | EC | The Extended Controller handles continuous Input/Output and logical operations. It provides 16 modulating slots, 16 status outputs (8 SOA, 8 SOB), and 16 optional status inputs. |
| Multifunction Controller | MC | The Multifunction Controller (MC) and Advanced Multifunction Controller (A-MC) handle continuous Input/Output operations, logical operations, and sequential control for batch operations. Each MC and A-MC has the capacity to control 16 modulating slots and can handle: up to 32 analog inputs, up to 72 analog outputs, up to 256 digital inputs, and up to 64 counter inputs. |
| Advanced Multifunction Controller | A-MC | |
| Low Level Process Interface Unit (PIU) | LLPIU | PIUs are used when a large number of process variables need to be monitored or fed to a higher-level module. |
| High Level Process Interface Unit (PIU) | HLPIU | |
| Low Energy Process Interface Unit (PIU) | LEPIU | |
| Data Highway Port | DHP | The Data Hiway Port (DHP) and LCS 620 Hiway Interface Module (HIM) provide a generic interface for non-Honeywell devices, for example: programmable controllers, analyzers, tank gauging systems, machinery monitoring systems, emergency shutdown systems, data acquisition systems, and compressor control systems. |
| LCS Hiway Interface Module | HIM | The 620 LCS programmable controller can optionally interface directly to the Data Hiway using a Hiway Interface Module (HIM) that plugs into the processor rack of the controller. |
| Reserve Basic Controller Directory | RCD | The Reserve Basic Controller Director, Reserve Extended Controller Director and Reserve Multifunction Controller Director are used to monitor the status of the primary and backup controllers when redundant controllers are configured. They are also used to switch control from the primary controller to the backup, and back again to the primary if required. |
| Reserve Multifunction Controller Director | RMCD | |
| Reserve Extended Controller Director | RECD | |

## Honeywell FSC Controller Integration

Experion PKS can unify multiple FSC systems into a single plant-wide safety system architecture. FSC, with its high diagnostic-based Quadruple Modular redundancy (QMR™) technology, increases system diagnostic capabilities and improves system tolerance for critical applications.

FSC integrates into the Experion PKS system in three ways:

- TPS UCN network connection (as described in the **TotalPlant** *Solution (TPS) System Integration* section)
- Single or redundant Ethernet connection to the Experion PKS Server (with or without FTE)
- Single or redundant fault tolerant serial link to the Experion PKS Server

A redundant Ethernet integration with Experion PKS delivers a TÜV approved redundant, fault tolerant integration, irrespective of whether the FSC controller is redundant or not. Detailed FSC system status and extended diagnostics are available to Experion Station. The redundant FSC safety controller contains two separate TÜV AK 6 (SIL3) approved Ethernet communication interfaces (covered by sophisticated diagnostics) communicating

real time fault tolerant data synchronously to Experion PKS. If a connection via Ethernet is not possible, a redundant, fault tolerant, RS232 or RS485 serial link is supported.

The FSC controller Sequence of Events (SOE) functionality is integrated with Experion PKS. Signals configured for SOE are time stamped by the FSC controller and transferred to the Experion PKS server upon read request. The request frequency is configurable. Additionally, the FSC Controller and Experion PKS Server can be configured to implement time synchronization. Data acquisition and control is managed as described in earlier sections with the advanced capabilities of report by exception scanning for high performance.On-Process Migration
This optional feature provides the ability to migrate the software from a current release to the next available release without taking the Experion PKS System off-line. In other words, Experion PKS stays on-line allowing the operators to maintain their view and control of the process during the upgrade procedure.

On-Process Migration is available for the Experion PKS Servers and controllers when configured with redundancy. This section expands upon the Server On-process Migration capabilities. Please refer to document EP03-300-200, Experion PKS Controller Specification & Technical Data for more information regarding the controller On-process Migration capabilities.

When configured for redundancy, this feature allows the Server's software to be upgraded. This involves the following process:

1. The backup Server node will be taken offline and upgraded to the new release and restarted.
2. The newly upgraded Server will then be synchronized with the running primary (previous release) Server node.
3. The Server nodes will be placed in a dual primary mode. In this mode the upgraded Server node's operation may be tested and confirmed against the previous release Server node.
4. Once the upgraded Server node's operation is confirmed the previous release Server node can be stopped and upgraded to the latest release software.
5. The Server node last upgraded is then started and synchronized returning the system to a standard redundant configuration.

## OPC Connectivity Options

### About OPC

OPC (OLE for Process Control) consists of a set of standards that define COM interfaces to be observed by OPC clients and servers. The COM interfaces are based on Microsoft's COM/OLE technology. These standards were established by the OPC Foundation to foster greater interoperability between automation and control applications, field systems and devices, and business and office applications. For detailed information about OPC, visit the OPC Foundation's Web site, http://www.opcfoundation.org.

OPC provides data from a data source (server) and communicates the data to any client application in a standard way, thereby eliminating the requirement for an application to have specific knowledge about a particular data source, such as its internal structure and communications protocols.

Experion PKS integrates OPC with DCS technology to create the most flexible and powerful OPC suite available. Contained within this suite are five OPC options, which are documented below. These OPC connectivity tools are fully integrated within the standard product, providing seamless integration.

**Table 3. OPC Connectivity Options**

| OPC Connectivity Tool | Features |
|---|---|
| OPC Advanced Client | Contains:<br>• OPC Advanced Alarm & Event Client – provides seamless integration of alarm & event information with no point building<br>• OPC Advanced Data Client – provides seamless integration of complex data (such as that found in a DCS) as Experion PKS points. |
| OPC Integrator | Integrates supervisory monitoring, alarming, and control data between two or more OPC Servers |
| OPC Client Interface | Allows third-party OPC Server information to be mapped, displayed, alarmed, historized, and controlled in the Experion PKS Server |
| OPC Data Access Server | Allows OPC Data Access Clients to view Experion PKS point data and the hierarchical area.point.parameter structure |
| OPC Alarm & Event Server | Exposes Experion PKS's alarm & event data, accepting connections from a version 1.0 OPC Alarm and Event Client |
| OPC Display Data Client | OPC option for Experion Stations (please reference document EP03-210-200, Experion PKS Station Specification & Technical Data |
| Redirection Manager | Stand-along software application that provides OPC server redundancy |

## OPC Advanced Client

The OPC Advanced Client option contains the OPC Advanced Alarm & Event Client and the OPC Advanced Data Client. As a whole, the OPC Advanced Client provides a unique capability to integrate complex data structures and their corresponding alarms within Experion PKS.

### OPC Advanced Alarm & Event Client

The OPC Advanced Alarm & Event Client allows Experion PKS to seamlessly integrate Alarm & Event Data from other OPC Alarm & Event Servers directly into the Experion PKS Alarm Summary.

The Alarm Summary treats OPC Alarm & Events in the same way as any other Experion PKS point, providing the operator with a uniform user interface. When an operator acknowledges the alarm, an acknowledgement confirmation is sent to the OPC Alarm & Event Server.

Facilities are provided for mapping Areas from the source OPC Alarm & Event Server into Experion PKS areas. Functionality is also provided to map alarm attributes from the source OPC Alarm & Event Server into Experion PKS's alarm attributes.

The OPC Advanced Alarm & Event Client supports version 1.02 of OPC Alarm & Event Servers.

### OPC Advanced Data Client

The OPC Advanced Data Client allows complex OPC data item structures (for example, those found in many DCS systems) to be built within the Experion PKS Server database as points.

Quick Builder is used to define OPC Advanced Points. The points contain user-defined parameters that map to OPC addresses for the desired complex data. Standard Experion PKS functions such as history, scripting, and display functions are available for OPC Advanced Points.

The OPC Advanced Data Client supports version 2.0 of OPC Data Access Servers.

## OPC Integrator

OPC Integrator is an open method allowing bi-directional data transfer between two or more systems for the purpose of supervisory monitoring, alarming and control.

OPC Integrator is valuable in the following scenarios:

- A supplier's system provides an OPC Data Access Server but no OPC Client. There is a requirement that the supplier's system retrieve data from an Experion PKS Server.
- Data needs to be transferred efficiently between C200 Controllers at the supervisory control layer.
- Experion PKS point data needs to be transferred to a third party OPC Server only when its data changes rather than when the point has been changed by an operator.

While OPC Integrator could be used to transfer data between two or more Experion PKS Servers, the DSA option has been specifically built for this application. DSA allows data to be transferred, and also transfers alarms, history, security, and messages, in a secure efficient manner.

OPC Integrator has many built-in features to ensure robust communication between OPC Servers. OPC Integrator supports redundant Experion PKS Servers and is therefore itself redundant. OPC Integrator also supports redundant third party OPC Servers. This high level of robustness and redundancy contrasts with other packages that advocate exercising caution when shutting down their offerings.

There are many engineering timesaving features included with OPC Integrator, such as:

- The ability to browse areas, points and parameters that exist on the source or destination OPC Server,
- the ability to browse OPC Server ProgID's on a particular server, and
- bulk item, import and export utilities.

The following points should be considered when purchasing OPC Integrator:

- OPC Integrator requires all servers to be OPC Data Access version 2.0 compliant.
- This product can be purchased in multiple units. One unit must be purchased for each remote OPC Server that Experion PKS is reading and writing data from.
- OPC Integrator does not need to be purchased for it's resident Experion PKS Server.
- If OPC Integrator is reading/writing data from redundant OPC Servers, only one unit needs to be purchased for the redundant OPC Server pair.

## OPC Client Interface

The OPC Client Interface capability allows third-party OPC Server information from to be mapped into the Experion PKS Server SCADA point structures. This information can then be displayed, alarmed, historized and controlled. The OPC Client Interface connects to either version 1.0 or 2.0 OPC Data Access Server.

## OPC Data Access Server

The OPC Data Access Server functionality allows OPC Data Access Clients to view Experion PKS Point data for control, plant-wide historization, etc.

The OPC Data Access specification's optional point browse section has been implemented, allowing OPC Data Access Clients to view the hierarchical Area.Point.Parameter structure of the Experion PKS Server.

## OPC Alarm & Event Server

The OPC Alarm & Event Server is designed to expose Experion PKS's Alarm & Event (A&E) data in an open manner to applications that require this information. The OPC A&E Server accepts connections from a version 1.0 OPC A&E Client. This product can be purchased in multiple units and is licensed on a per remote node basis. Only one unit needs to be purchased to support redundant OPC A&E Clients.

## Redirection Manager

Redirection Manager (RDM) provides OPC Server redundancy by transparently redirecting client requests to a secondary OPC Server when the primary OPC Server is unavailable. Although RDM is a stand-alone software application, it is ideal for use with Experion PKS when using OPC client options to interface to third party OPC Servers that are typically not redundant. Note that Experion PKS OPC Servers are redundant by default when the Experion PKS redundancy option is employed. Therefore RDM is not required to provide Experion PKS OPC redundancy.

RDM provides redundancy for OPC Data Access Servers as well as OPC Alarm & Event Servers. Other features include:

- The primary and secondary OPC servers can be active servers versus being forced to have a primary with a standby only server
- RDM will start the OPC Server if the secondary node is available but does not have the OPC server running.
- RDM allows the primary and secondary OPC servers to serve data to other OPC clients that are not part of a redundancy scheme.

# SCADA Interfaces

Experion PKS provides Data Acquisition and Control facilities to communicate with a wide range of controllers and Remote Terminal Units (RTUs), listed in Table 4.

### Data Acquisition

Experion PKS supports acquisition of data using either:

- Periodic Scanning – utilizing this technique, Experion PKS optimizes communications traffic by automatically calculating the minimum number of scan packets required to collect the data.
- Report by Exception (RBE) – where supported by the controller, this technique is used to reduce the scanning load of the system while improving system response.

If necessary, periodic scanning may be used in conjunction with RBE to ensure data integrity.

### On-line Configuration

Given a sufficient level of system privilege, it is possible for users to view, manipulate and analyze all data related to the SCADA interfaces. For example a user at any Operator Station in the system (including those operating remotely – even via dial-up modem links) could change an alarm limit for a point in an RTU.

### Diagnostics

Once a controller or RTU is configured and placed in service, Experion PKS automatically performs diagnostic scanning of the device. Additionally, Experion PKS performs checks on data integrity of all data acquired from the controller. Should an invalid or timed-out response be received, the data is ignored and the transaction is recorded as an error. Statistics are kept and displayed by the system on communication errors by means of a communications barometer. The barometer value will increment for every failed call and will decrement for each successful call. In addition, the system alarms separate *marginal* and *failure* conditions based on user-defined limits to advise the operator of a controller that is in error. Communications statistics are displayed on a standard system display and are available through the reporting sub-system or custom displays. If a controller fails, all point parameter values that are sourced from it are indicated as bad to the operator.

**Table 4. SCADA Interfaces with Connection Details**

| SCADA Interface Software | Connection Type |
|---|---|
| Honeywell FSC Integration | Serial and Ethernet |
| Honeywell S9000 Integration | Ethernet |
| Honeywell 620 LCS Serial and Ethernet Interface | Serial and Ethernet |
| Honeywell UDC 3000/5000/6300 Integration | Serial |
| Honeywell Micromax LPU & Video Paperless Recorder | Serial |
| Honeywell XLNET HVAC Controller Interface Software | Cbus |
| Honeywell DPR Recorders (DPR 100, 180, 3000) | Serial |
| Honeywell RM7800 Flame Safeguard | Serial |
| Honeywell Universal Modbus Interface | Serial |
| Allen-Bradley Serial Interface (Does not require RSLinx) | Serial |
| Allen-Bradley RSLinx Interface | Serial, Ethernet,DH+, and ControlNet |
| Applicom Interface | Proprietary |
| Asea Interface | Serial |
| Bailey InfiNet 90 Interface | Ethernet, SCSI and Serial |
| Bristol Babcock RTU Interface | Serial |
| DNP3 Protocol Interface | Open Standard Serial and Ethernet (UDP) |
| GEC GEM80 PLC Interface | Serial |
| GE Fanuc Series 90 PLC via Ethernet (requires MZ-AUIF01) | Ethernet |
| HITACHI Interface | Serial |
| Modbus (RTU, Plus, ASCII, & TCP) Interface | Serial, Modbus+, Ascii and Ethernet |
| Moore 351,352,353,383 Interface | Serial |
| Moore APACS Interface | Ethernet and Modulbus |
| OPC Client Interface | Open Standard |
| Siemens S5/S7 &TI PLC Via H1 / TF API | H1/Industrial Ethernet |
| YamatakeMA500 Interface | Serial |

## Open Data Access

Whenever another application requires data from the Experion PKS database, Open Data Access is required. For example, Open Data Access is required when:

- Reading data into a Microsoft Excel Spreadsheet
- Running a query on the database from Microsoft Access
- A user written application is accessing the database

Each is considered a 'user' of Open Data Access. The two main components to Open Data Access are the ODBC Driver and Network Server.

### ODBC Driver

ODBC is a standard set of function calls for accessing data in a database. These calls enable you to perform Structured Query Language (SQL) queries on the database. ODBC can be used in any client/server architecture, regardless of whether the database and client application are resident on the same computer, separated by a network, or even if they are on different computers using different operating systems.

The ODBC Driver allows the Server database to be queried using SQL commands from ODBC client applications, such as Microsoft Access. Additionally, custom application written in Visual Basic or C++ can also access the server database via the ODBC Driver. The Server database is exposed as a number of read-only ODBC tables including Points, Event History and Process History. Driver features include:

- Open read-only access to plant real-time and historical data
- Throttling to prevent performance impact
- Redundancy of data storage
- Fully functional examples for productivity improvements

It is optimized for Microsoft Access and other ODBC ad hoc query/report applications.

The Experion PKS ODBC driver has two parts: the ODBC Server and the ODBC Client. The ODBC Client handles the ODBC call made by a client application and passes it to the ODBC Server. The ODBC Server processes the ODBC calls, queries the Experion PKS server database and returns the information to the client application.

The ODBC Server always runs on the Experion PKS server computer. The Experion PKS ODBC Client can run on the server or on any other computer on the network. Figure 9 shows a basic Experion PKS ODBC driver configuration.

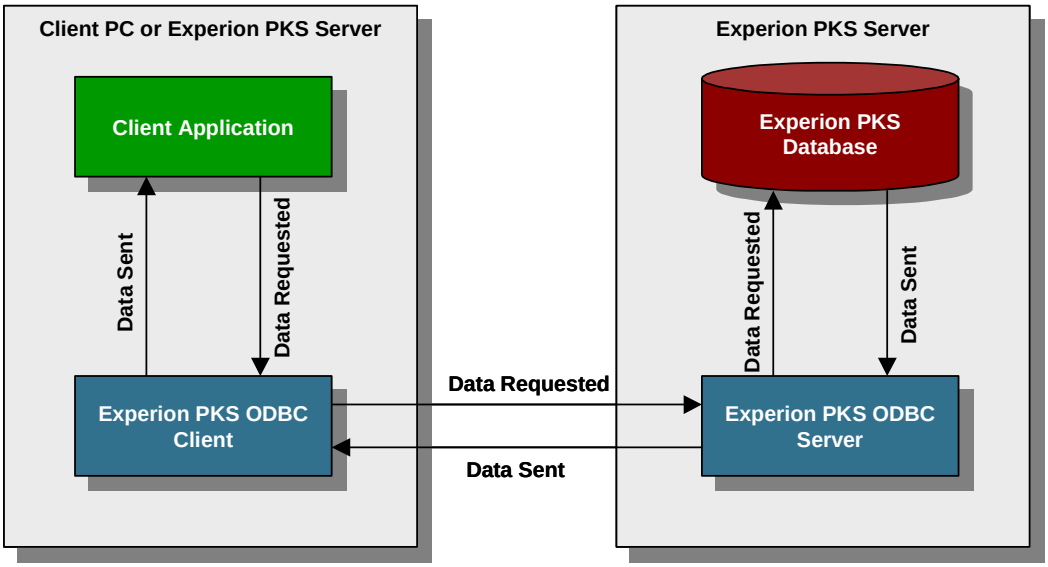



**Figure 8. Accessing Data via the ODBC Driver**

### Network Server

The Network Server provides extremely efficient, access to the Experion PKS database for network based applications such as Microsoft Excel Data Exchange and Network API options.

- Microsoft Excel Data Exchange allows Microsoft Excel to obtain real-time and historical data from the Experion PKS system. This option provides read and write access to data in one or more Experion PKS Databases, providing a powerful data consolidation and reporting tool. Wizards for Microsoft Excel are included to help set up the data to be collected.
- Applications executing on other network-connected platforms may easily access Experion PKS real-time data over the network using the Network API. The API provides high-level subroutine calls in Visual C/C++ or Visual Basic to allow read/write access to Experion PKS data in a networked environment.

## *21 CFR Part 11*

The Experion PKS server provides enhanced capabilities to support the Pharmaceutical industry and other FDA regulated industries and their unique requirements related to regulations such as 21 CFR Part 11. These features may be employed in any industry but are specifically designed to meet the guidelines of 21 CFR Part 11.

### Electronic Signature Option

This option enables the following:

- Electronic Signatures on C200 Messages
- Electronic Signatures on SCADA points
- Journaling of OPC Server changes to the database
- Journaling of Network Server changes to the database
- Electronic Signatures on Point Scheduler
- Support for reason sets for control actions on SCADA points
- Journaling of changes that have been made to the Server database using Quick Builder. Full Printed name of the user that performed the download will be recorded.
- Ability to securely enable and disable Electronic Signatures by area

### Compliance Restriction Option

This option is applied in addition to the Electronic Signature Option. Generally, it restricts the system so that options required to meet 21 CFR Part 11 compliance are always enforced. Specifically, it provides the following additional features:

- System must be running to perform Quick Builder downloads
- Only windows users that are also Experion PKS operators can perform Quick Builder downloads
- The system will default to using Full Operator name in events on startup and the field to change this setting shall not be shown on the system configuration display

## *Application Enablers*

The Experion PKS Server provides powerful application enablers with configurable (rather than programmatic) facilities to support individual application requirements. Application implementation time is greatly reduced, providing extremely cost effective automation.

### Batch Reporting

Batch Reporting enables integrated reporting of batches or lots of a production process run, to be compiled and archived automatically by the Experion PKS Server. This feature enables batch history and events to be output either as a CSV file or directly into Microsoft Excel, if available. The Batch Report option is designed as a simple discontinuous batch or lot reporting option. For a complete batch solution with Experion PKS, please refer to **TotalPlant** Batch (TPB), which is completely integrated with Experion PKS providing advanced batch control and advanced reporting tools.

## Recipe Management

Recipe Management provides facilities to create recipes and download them to nominated process units. Each recipe may have up to thirty items, with recipes chained together to form larger recipes, if required. Recipe items may be used to set ingredient targets, set alarm limits, set timers and place equipment into correct operating state. Items may be individually enabled for scaling.

## Point Control Scheduler

The Scheduler option allows point supervisory control to be automatically scheduled to occur at a specified time. This may occur on a “one-shot” basis, daily, workday, weekend, holiday, or a day of the week.

## Alarm Pager

Point alarms may optionally be sent to an alarm paging or messaging system. Up to 100 pagers can be configured, and each pager has a schedule of operation so that users are only paged when they are on call. The information they receive is what normally appears on the alarm summary. For each phone number configured, the user may specify the days of the week and times of the day that the pager is in use. Points can be scheduled to ring one or more of the configured pagers.

When sending alarms to a pager, there are two methods of connection that can be used. The methods of connection are:

- Direct connection to a paging system
- Connection by modem to a paging service provider

When an alarm is being paged to a pager, the system checks which connection method is being used. It then checks that there is communication with the paging system or modem. If paging is through the modem, the system then dials the paging service provider number and logs on to the provider’s network. If paging is by direct connection to a paging system, Alarm Paging logs directly into that paging system.

After successful connection is made, Alarm Paging attempts to send the unacknowledged alarms to all of the pagers nominated for each individual alarm. Each paging message in the queue can be paged out to up to 100 pagers. Message ‘blocks’ are sent to each pager in turn, until all messages are sent. If the provider allows it, Alarm Paging sends multiple message blocks at the same time, thus reducing the amount of times it has to call the provider.

The alarm pager option can also be configured to send alarms to an e-mail address. The system communicates with e-mail using SMTP, which is installed as part of Internet Information Services (IIS), included with Windows 2000. Additionally, the alarm pager can communicate to SNMP managers.

## ODBC Data Exchange

This option enables two-way exchange of data between the Experion PKS Server database and an ODBC-compliant local or network third-party database. It uses standard Structured Query Language (SQL) commands. The Experion PKS Server acts as a client application in this configuration. This is in contrast with the ODBC Driver option where the Experion PKS server acts a server application. Data from an Experion PKS server database can be transferred to a third-party database, and data from a third-party database can be transferred into the Experion PKS server database. Information exchanged includes point values, point history, and user file data. Databases that include ODBC drivers include Microsoft SQL Server, Oracle 7, Microsoft Access, and Sybase 10.

This option can be configured to periodically exchange data or exchange on request.

## Application Toolkit

Two application-programming interfaces (API) are available. The first is for applications written to execute on the Experion PKS server and the second is for applications that are required to run on network-based clients (that are not necessarily operator stations).

The API (programmed in C/C++) on the server includes the following functions:

- Read and write to point parameters in the database
- Access to historical data
- Initiate supervisory control actions
- Access to the alarm/event subsystem
- Access to user-defined database
- Provide a prompt for operator input

The API (programmed in Visual Basic or Visual C/C++) on the network-based clients includes the following functions:

- Read and write to point parameters in the database
- Access to historical data
- Initiate supervisory control actions
- Access to user-defined database
- Create alarms/events

# Specifications and Sizing

## Server PC

A PC must meet the following specifications to be used as an Experion PKS Server. These specifications are intended as guidelines for customer-supplied platforms. Honeywell-supplied platforms will meet these specifications but may not necessarily be the example platforms listed below.

| System Configuration | Minimum *(ACE Suggestion)* | Typical | Performance |
|---|---|---|---|
| Processor | Dual 1 GHz Pentium III or faster [1] | Dual 1.13 GHz Pentium IIII or faster [1] | Dual 2.0 GHz Xeon or faster |
| Cache | 512 K | 512 K | 512 K |
| RAM | 1 GB [2]<br>(512 MB acceptable for ACE) | 1 GB [2] | 2 GB |
| Networking | 100 Mb Ethernet [3] | 100 Mb Ethernet | 100 Mb Ethernet<br>1000 Mb Ethernet |
| Video Resolution | 1024 x 768, 65K colors | 1024 x 768, 65K colors | 1024 x 768, 65K colors |
| Hard Drive | 18.2 GB | 36 GB | 36 GB |
| Operating System | Windows 2000 Server | Windows 2000 Server | Windows 2000 Server |
| Example Hardware<br>*Please contact your Honeywell representative for Honeywell-supplied platform details.* | Dell PowerEdge 1400/1600, Dual CPU | Dell PowerEdge 1600, Dual CPU or Dell PowerEdge 2600, Dual CPU | Dell PowerEdge 1600, Dual CPU or Dell PowerEdge 2600 Dual CPU |

*Note 1* – It is possible to exceed the single CPU processing power in some larger configurations. For these large systems, a platform running two CPUs should be considered.

*Note 2* – In these configurations, paging may occur on these systems. Based on the intended usage of the platform, this configuration is acceptable. For better performance, users should upgrade the systems with an additional 128 MB of RAM.

*Note 3* – 10 Mb Ethernet Network between Servers and Stations is not officially supported, although it may still perform acceptably on small systems.

## Redundancy Performance

The Experion PKS server redundancy option is an extremely robust and mature subsystem designed to provide the highest possible availability with the following specifications:

| | Specification |
|---|---|
| Checkpoint Period | Default setting is 300 seconds (5 minutes) [1] |
| User-defined File Backup Period [1] | Default setting is 60 minutes |

*Note 1* – Checkpointing is a cyclic process that copies the contents of the memory-resident part of the database to the backup server. This is not to be confused with the constant update of the backup server's database (includes acquired data, process history, alarms and events, etc.) while the servers are synchronized.*Note 2* – This is the file backup for user-defined files. This is not to be confused with the automatic synchronizing of database files between the primary and backup servers.

## Database Sizing

The Experion PKS Server database is sized per the following specifications:

| Database Item | Default Size | Maximum Size |
|---|---|---|
| Point Count [1] | 0 → 20,000 Process Points<br>0 → 65,000 SCADA Points<br><br>Process Points + SCADA Points ≤ 65,000 Points | 65000 Points |
| Station Connections | License | 40 [2] |
| Printer Connections | 50 | 50 |
| Channels | 90 | 99 |
| SCADA RTUs (Controllers) | 100 | 255 |
| Algorithm Blocks | 6000 | 6000 |
| Areas | 1000 | 1000 |
| DFD's (Dynamic Objects) on Named Displays | 1000 | 1000 |
| Trend Sets | 3000 | 3000 |
| Operating Groups | 16000 | 16000 |
| Reports | 1000 | 1000 |
| Point Control Schedules | 1000 | 1000 |
| Operators | 1000 | 32767 |
| Recipes | 500 | 32767 |
| Concurrent Alarms | 1000 | 1000 |
| Concurrent Messages | 1000 | 1000 |
| Stored Events | 32000 | 32767 |
| Extended Events | Limited by Hard disk size | Limited by Hard disk size |
| STD History Point Parameters | 2000 | 10000 |
| EXTD History Point Parameters | 2000 | 10000 |
| FAST History Point Parameters | 500 | 10000 |
| Number of User Files | 3 | 150 |
| Number of Application Tasks | 80 | 80 |
| Point Lists | 2000 | 2000 |
| SOE Entries | 10000 | 32767 |

*Note 1* – The Experion PKS Database can be comprised of a mix of SCADA and Process Points in increments of 100 Points.

*Note 2* – When a system includes Process Points, the number of Stations connections may need to be limited to keep the data access performance within specified limits (see the Data Access Performance table on page 29). Servers with large numbers of Process Points may be limited to supporting a maximum of 20 Station connections.

## *Real Time Database SCADA Point Structures*

The following point structures and associated parameters are provided in the Real Time Database when interfacing to SCADA devices.

| Point Structure | Standard Parameters | | |
|---|---|---|---|
| **Analog** | • Point Name | • Scan Status | • SP Low Limit |
| | • Point Description | • OP High Limit | • 0% & 100% Range |
| | • Control Deadband | • Scan Period | • Operator Control Level |
| | • Process Variable | • Scan Address | • OP Low Limit |
| | • Setpoint | • Control Timeout | • PV Clamp Flag |
| | • Normal Mode | • Alarm Permit Flag | • Engineering Units |
| | • Output | • Alarm Status | • Drift Deadband |
| | • Mode | • Up to 8 Alarm types [1] | • Alarm Deadband |
| | • SP High Limit | • Alarm Status | • Associated Display |
| | • Up to 4 user definable inputs | • PV Last Processed Time [2] | |
| **Status** [3] | • Point Name | • Output | • Output Pulse Width |
| | • Point Description | • Scan Status | • Re-Alarm Status |
| | • Output Width | • Normal Mode | • Associated Display |
| | • Process Variable | • Scan Period | • Alarm Permit Flag |
| | • Control Timeout | • Scan Address | • Input Width |
| | • Mode | • Alarm Priority | • Control Failure Alarm Priority |
| | • PV Last Processed Time [2] | • Operator Control Level | |
| **Accumulator** [4] | • Point Name | • Scan Status | • Output Pulse Width |
| | • Point Description | • Normal Mode | • Re-Alarm Status |
| | • Output Width | • Scan Period | • Associated Display |
| | • Process Variable | • Scan Address | • Input Width |
| | • Control Timeout | • Mode | • Alarm Priority |
| | • Output | • Alarm Permit Flag | • PV Last Processed Time [2] |
| | • Operator Control Level | • Control Failure Alarm Priority | |

*Note 1* – Supported alarms include: PV Hi, PV Lo, PV HiHi, PV LoLo, Deviation Hi, Deviation Lo, Transmitter Hi, Transmitter Lo, Rate of Change, Control Fail, and Control Timeout. Each of the configured alarms can be assigned a priority ranging from Journal, Low, High to Urgent. An alarm sub-priority (0 to 15) can also be assigned to further differentiate alarms.

*Note 2* – Each time the PV is polled from the RTU, Experion PKS will track and maintain the time/date of when the value last changed, or more specifically, was last processed. If the Analog point in Experion PKS, has a drift deadband of 1%, then the last processed time is not updated until the PV moves by >1%. Similarly, if the drift deadband is 0%, then the last processed time is not updated until the PV moves slightly.

*Note 3* – The PV of a status point can range from a single bit to a three bit digital input, allowing up to eight possible states.

*Note 4* – Data associated with pulsed inputs are stored in the system in an accumulator point type that will provide automatic tracking of instrument rollover.

## History Sizing

The Experion PKS server history subsystem meets the following specifications:

| | Default Duration | Default Number of Samples | Maximum Duration | Maximum Number of Samples |
|---|---|---|---|---|
| **Standard History** | | | | |
| 1 minute snapshot | 24 hours | 1442 | 69 days | 100,000 |
| 6 minute average [1] | 7 days | 1682 | 416 days | 100,000 |
| 1 hour average [1] | 1 month | 746 | 11.4 years | 100,000 |
| 8 hour average [1] | 3 months | 281 | 91.2 years | 100,000 |
| 24 hour average [1] | 1 year | 368 | 273.8 years | 100,000 |
| **Extended History** | | | | |
| 1 hour snapshot | 3 months | 2233 | 11.4 years | 100,000 |
| 8 hour snapshot | 1 year | 1099 | 91.2 years | 100,000 |
| 24 hour snapshot | 3 years | 1831 | 273.8 years | 100,000 |
| **Fast History [2]** | | | | |
| 1 second snapshot | 2 hours | 7262 | 27.8 hours | 100,000 |
| 2 second snapshot | 4 hours | 7262 | 55.6 hours | 100,000 |
| 3 second snapshot | 6 hours | 7262 | 3.5 days | 100,000 |
| 4 second snapshot | 8 hours | 7262 | 4.6 days | 100,000 |
| 5 second snapshot | 10 hours | 7262 | 5.8 days | 100,000 |
| 10 second snapshot | 20 hours | 7262 | 11.6 days | 100,000 |
| 15 second snapshot | 30 hours | 7262 | 17.4 days | 100,000 |
| 30 second snapshot | 60 hours | 7262 | 34.7 days | 100,000 |

*Note 1* – The averages are calculated using the 1-minute base interval. That is, 6-minute averages are calculated on six 1-minute values.
*Note 2* – Only one of the Fast History intervals can be configured per server. The 5-second snapshot is the default Fast History interval.

## Data Access Performance

The following specifications apply to the Acquisition and Control subsystem of the Experion PKS Server:

| | Specification |
|---|---|
| Maximum PPS from all Controllers (C200, FIMs, and IOLIMs) – Not including ACE [1] | 4000 PPS |
| Maximum PPS from all ACE Nodes (through Ethernet or FTE) | 2000 PPS |
| Maximum DSA PPS from each remote DSA Server | 1000 PPS |
| Maximum OPC PPS from all configured OPC Servers | 1600 PPS |
| Maximum number of remote OPC Data Access Servers subscribed to by the Experion PKS Server (OPC Data Access Client) | 5 |
| Maximum OPC PPS published to all OPC Clients | 2000 PPS |
| Maximum number of remote OPC Data Access Clients supported by the Experion PKS Server (OPC Data Access Server) | 5 |

*PPS – Average parameters per second*
*Note 1 – .Not including SCADA interfaces to the server (i.e. A-B PLC 5, FSC, etc.)*

## Notification Performance

The following specifications apply to the Alarm & Event subsystem of the Experion PKS Server:

| | Specification |
|---|---|
| Maximum number of events (burst condition) | 1000 events [1] |
| Maximum number of sustained events/second | 40/sec |
| Maximum number of sustained alarms/second [2] | 20/sec |
| Maximum number of remote OPC A&E Servers subscribed to by the Experion PKS Server | 5 [3] |
| Maximum number of remote OPC A&E Clients supported by the Experion PKS OPC A&E Server | 5 |

*Note 1 – The Experion PKS Server Alarm System will handle an event burst of up to 1000 events, with a minimum time between consecutive bursts. An "event burst" is defined as a group of events greater than 40/sec, received from all connected Event Servers in a period of less than 3 seconds. The time period required between consecutive bursts, to allow for event processing, can be calculated using the following formula:*

$\Delta T = BS/(40-ER)$

*Where:*

$\Delta T$ = # of seconds required between bursts
BS = Burst Size (number of events in the burst)
ER = Event Rate between bursts

*Examples:*

1) 1000 Event burst and no events between bursts: $\Delta T = 1000/40 = 25$ seconds
2) 500 Event burst with 30 events/sec between: $\Delta T = 500/10 = 50$ seconds

*Note 2 – Up to two events are also generated for every alarm, including one event for entering the alarm condition and one for return to normal.*

*Note 3 – The Experion PKS Server includes the option to support OPC Alarms & Events in addition to native Experion PKS notifications. When the Experion PKS Server is configured to receive alarms and events from an OPC Alarm & Event Server, the notification limits noted in this table are applicable to the combined set of events received from all connected event sources.*

# Distributed Systems Architecture

DSA performance specifications are as follows:

## DSA Publishing Server Communications Performance

| Available Network Bandwidth [1] | Maximum Network Throughput (Param/Second) [2] | Maximum Throughput/Server (Param/Second) [3, 4] | Maximum Subscribing Servers |
|---|---|---|---|
| 64 Kb | 100 | 100 | 1 |
| 128 Kb | 200 | 200 | 2 |
| 256 Kb | 400 | 400 | 3 |
| 512 Kb | 800 | 800 | 8 |
| 1Mb | 1,000 | 1,000 | 9 |
| 2 Mb | 2,000 | 1,500 | 9 |
| 10 Mb | 10,000 | 2,000 | 9 |
| 100 Mb | 100,000 | 2,000 | 9 |

*Note 1* – "Available Network Bandwidth" means dedicated continuously available bandwidth for DSA use between the Servers, and not shared bandwidth with other applications such as Station access or Control Builder Multi-User access.
*Note 2* – Maximum traffic on any individual network segment.
*Note 3* – For Experion PKS Servers with Process Points, the total parameter throughput caused by remote station displays, local station displays, fast history, etc., cannot exceed 1000 parameters/sec.
*Note 4* – A subscribing Station is one that displays data from another publishing server through DSA. A larger number of Stations subscribing to remote data will result in a greater amount of network t*raffic. Absolute maximum number of subscribing Stations/publishing Server is 20.*

## DSA Subscribing Server Communications Performance

| Available Network Bandwidth [1] | Maximum Network Throughput (Param/Second) [2] | Maximum Publishing Servers |
|---|---|---|
| 64 Kb | 100 | 1 |
| 128 Kb | 200 | 2 |
| 256 Kb | 400 | 4 |
| 512 Kb | 800 | 6 |
| 1Mb | 1000 | 8 |
| 2 Mb | 2000 | 9 |
| 10 Mb | 10000 | 9 |
| 100 Mb | 100000 | 9 |

*Note 1* – "Available Network Bandwidth" means dedicated continuously available bandwidth for DSA use between the Servers, and not shared bandwidth with other applications such as Station access or Control Builder Multi-User access.
*Note 2* – Maximum traffic on any individual network segment.

## Miscellaneous DSA Specifications

| | Specification |
|---|---|
| Maximum alarm/notification rate | 20/sec/server |

## Alarm Pager

The following specifications apply to the alarm paging option.

| Protocols | Remarks |
|---|---|
| Paging Entry Terminal (PET) [1] | |
| Telocator Alphanumeric Protocol (TAP) [1] | |
| UCP protocols<br>• UCP 01<br>• UCP 30<br>• UCP 51 | Mainly used in Europe.<br>The two-digit suffixes refer to the EMI command numbers being used by the provider. |
| *Note 1* – Service Providers in North America generally use the PET or TAP protocols. | |

# Model Numbers

## Server Hardware

| Model Number | Description |
|---|---|
| MZ-NTPC05 | Advanced Performance Server with Windows 2000 Server |
| MZ-NTPC07 | Rack-ready Advanced Performance Server with Windows 2000 Server |
| MZ-PCRT06 | High Resolution 21” CRT Monitor |
| TP-DFP201 | Desktop 20.1” Flat Panel Display |
| MZ-PCEB31 [1] | Ethernet Comm. Board for Server PC |
| MZ-PCEM33 | 512 MB DIMM Memory Module for Server PC |
| MZ-PCDT03 | Terminal Server-8 RS232 Ports, RJ45 |
| MZ-PCEB12 | 8 Port RS-232/422/485 Serial Board PCI Bus |
| MZ-PCEB11 | 8 Port RS-232/422/485 Expansion Module |
| MZ-PCDD06 | Trackball w/PS-2 Connector |
| [1] *See Fault Tolerant Ethernet Specifications and Technical Data document for FTE hardware* | |

## Server Database

| Model Number | Description |
|---|---|
| EP-DBASE1 | Database Base Software |
| EP-DPR100 | 100 Process Point Adder to Database Size |
| EP-DPR01K | 1,000 Process Point Adder to Database Size |
| EP-DPR02K | 2,000 Process Point Adder to Database Size |
| EP-DPR05K | 5,000 Process Point Adder to Database Size |
| EP-DPR10K | 10,000 Process Point Adder to Database Size |
| EP-DSC100 | 100 SCADA Point Adder to Database Size |
| EP-DSC01K | 1,000 SCADA Point Adder to Database Size |
| EP-DSC02K | 2,000 SCADA Point Adder to Database Size |
| EP-DSC05K | 5,000 SCADA Point Adder to Database Size |
| EP-DSC10K | 10,000 SCADA Point Adder to Database Size |

## Server Redundancy

| Model Number | Description |
|---|---|
| EP-RBASE1 | Redundancy Base Software |
| EP-RPR100 | 100 Process Points Redundancy Adder |
| EP-RPR01K | 1,000 Process Points Redundancy Adder |
| EP-RPR02K | 2,000 Process Points Redundancy Adder |
| EP-RPR05K | 5,000 Process Points Redundancy Adder |
| EP-RPR10K | 10,000 Process Points Redundancy Adder |
| EP-RSC100 | 100 SCADA Points Redundancy Adder |
| EP-RSC01K | 1,000 SCADA Points Redundancy Adder |
| EP-RSC02K | 2,000 SCADA Points Redundancy Adder |
| EP-RSC05K | 5,000 SCADA Points Redundancy Adder |
| EP-RSC10K | 10,000 SCADA Points Redundancy Adder |

## Distributed System Architecture

| Model Number | Description |
|---|---|
| EP-XRSVR1 | DSA 1 Remote Server License |

## TPS Integration

| Model Number | Description |
|---|---|
| EP-IHWTPS | Honeywell TPS Integration |
| EP-IHWTRD | Honeywell TPS Integration Redundancy |

## TDC3000 Data Hiway Integration

| Model Number | Description |
|---|---|
| EP-IHWTDC | Honeywell TDC 3000 Data Hiway Integration |
| MZ-PCDB02 | High Performance Ethernet Bridge |

## Additional Honeywell Device Integration

| Model Number | Description |
|---|---|
| EP-IHWFSC | Honeywell FSC Integration |
| EP-IHWS9K | Honeywell S9000 Integration |
| EP-IHW620 | Honeywell 620 LCS Serial and Ethernet Interface |
| EP-IHWUDC | Honeywell UDC 3000/5000/6300 Integration |
| EP-IHWMMX | Honeywell Micromax LPU & Video Paperless |
| EP-IHWXLN | Honeywell XLNET HVAC Controller Interface |
| EP-IHWDPR | Honeywell DPR Recorders (DPR 100, 180, 3000) |
| EP-IHWFSG | Honeywell RM7800 Flame Safeguard |
| EP-IHUMB | Honeywell Universal Modbus Interface |

## SCADA Interfaces

| Model Number | Description |
|---|---|
| EP-IDNP3P | DNP3 Protocol Interface |
| EP-IMDBUS | Modbus (RTU, Plus, ASCII, & TCP) Interface |
| EP-IABSER | Allen-Bradley Serial Interface (Does not require RSLinx) |
| EP-IABRSL | Allen-Bradley RSLinx Interface (requires EP-IRSL24) |
| EP-IABINT | Allen-Bradley Integration (requires EP-IABSER or EP-IABRSL) |
| EP-IRSL24 | Allen-Bradley RSLINX Software, Ver. 2.4 [1] |
| EP-IGES90 | GE Fanuc Series 90 PLC via Ethernet (requires EP-IGEAPI) |
| EP-IGEAPI | GE API License |
| EP-ISMNS5 | Siemens S5 &TI PLC Via H1 / TF API |
| EP-IGEM80 | GEC GEM80 PLC Interface |
| EP-IYTMA5 | Yamatake MA500 Interface |
| EP-IBBRTU | Bristol Babcock RTU Interface |
| EP-IMR35X | Moore 351, 352, 353, 383 Interface |
| EP-IAPLCM | Applicom Interface |
| EP-IHTCHI | HITACHI Interface |
| EP-IASEAI | Asea Interface |
| EP-IMAPAC | Moore APACS Interface |
| EP-IBYI90 | Bailey InfiNet 90 Interface |

*Note 1* – RSLinx is available in a variety of packages with varying degrees of functionality. One feature of RSLInx is the exposure of underlying device data via an OPC Data Access Server. RSLinx OEM, the package provided with this model number only allows non-remote (OPC client resident on the same PC as RSLinx) OPC clients to connect to the OPC Server. If the OPC Data Access Server of RSLinx is required and must be accessed by remote OPC clients, please purchase the RSLinx Gateway version directly from Rockwell Automation or a distributor.

## Application Enablers

| Model Number | Description |
|---|---|
| EP-AERMGR | Recipe Manager |
| EP-AESHED | Point Control Scheduler |
| EP-AEODBX | ODBC Data Exchange |
| EP-AEPAGE | Alarm Pager |
| EP-AEBRPT | Batch Report |

## Application Toolkit

| Model Number | Description |
|---|---|
| EP-AEAPTK | Application Development Toolkit |

## Open Data Access

| Model Number | Description |
|---|---|
| EP-UODA1U | Open Data Access, per User |

## OPC

| Model Number | Description |
|---|---|
| EP-OPCCLI | OPC Client Interface |
| EP-OPCCAD | OPC Advanced Client |
| EP-OPCINT | OPC Integrator, per Connection |
| EP-OPCSDA | OPC Data Access Server, per Connection |
| EP-OPCSAE | OPC Alarm & Event Server, per Connection |
| TP-RDM000 | Redirection Manager |

## Engineering Tools

| Model Number | Description |
|---|---|
| EP-TQBLDR | Quick Builder – SCADA database builder |
| EP-TDSPBD | HMIWeb Display Builder |

## On-Process Migration

| Model Number | Description |
|---|---|
| EP-OPM0BS | Base On-Process Migration Support |
| EP-OPM100 | 100 Point On-Process Migration Support |
| EP-OPM01K | 1,000 Point On-Process Migration Support |
| EP-OPM02K | 2,000 Point On-Process Migration Support |
| EP-OPM05K | 5,000 Point On-Process Migration Support |
| EP-OPM10K | 10,000 Point On-Process Migration Support |

## 21 CFR Part 11 Options

| Model Number | Description |
|---|---|
| EP-ESIG01 | Electronic Signature Option |
| EP-ESIG02 | Electronic Signature Compliance Restriction |

# Glossary

| Term or Acronym | Description |
|---|---|
| ACE | Application Control Environment |
| C200 | Experion PKS Controller |
| CEE | Control Execution Environment |
| Cache (dynamic cache) | Performance feature of the Experion PKS server that allows it to read and write only to currently required parameters. This is in contrast to constantly polling the controllers for all data. |
| Checkpoint(ing) | A cyclic process that copies the contents of the memory-resident part of the database to the backup server. This is not to be confused with the constant update of the backup server's database while the servers are synchronized. |
| COM | Component Object Model |
| Composite Point | The Experion PKS point structure that contains many parameters such as PV, SP, Mode, etc. |
| DCS | Distributed Control System |
| DSA | Distributed Systems Architecture |
| Electronic Signature | The legally binding equivalent of an operator's handwritten signature |
| ES-T | Experion Station - TPS |
| ESVT | Experion Server TPS |
| HTML | HyperText Markup Language |
| ODBC | Open Data Base Connectivity |
| OLE | Object Linking and Embedding |
| OPC | OLE for Process Control |
| PLC | Programmable Logic Controller |
| Process Points | Points originating in a CEE device such as a C200 or ACE. |
| RDM | Redirection Manager |
| RTU | Remote Terminal Unit |
| SCADA | Supervisory Control and Data Acquisition |
| SCADA Points | Points configured to access devices via optional SCADA interfaces. |
| SES | System Event Server |
| SMTP | Simple Mail Transfer Protocol |
| SNMP | Simple Network Management Protocol |
| SPS | System Performance Server |
| SQL | Structured Query Language |
| TPS | **TotalPlant** Solution |

# Experion PKS ®

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